Space Weather Forecast

Issued on Sunday 2 February 2025 at 12:00 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of G1 Minor Storms Day 1 (02 Feb) with fast solar winds and a potential CME glance. Further Moderate expected.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Moderate over the last 24 hours with two Moderate-class flares, peaking at 02/1012 UTC from a developing region in the northeast.

There are up to nine active regions on the Earth-facing disc, seven of which are numbered. The majority of the activity is from the cluster of sunspots in the northeast, consisting of four moderately large bipolar groups. These form a complex area of multiple active regions, with signs of magnetic interaction between the regions suggesting the ongoing potential for notable flares. The eastern-most of these regions is showing rapid growth and increasing magnetic complexity, and was responsible for the largest flare in the past 24 hours mentioned above. The remaining spots groups are small and magnetically simple, with either limited evolution or slow decay.

There have been no Earth directed CMEs (coronal mass ejections) observed in available imagery in the past 24 hours. A fast, asymmetric halo CME emerging after 02/0530UTC is assessed as being from a far-side source from available imagery.

Solar Wind / Geomagnetic Activity: Solar winds showed the connection to a fast solar wind stream. Wind speeds were strong, generally 600-700km/s. The Interplanetary Magnetic Field, was initially moderate but decreased to weak levels after 01/2100UTC. The north-south component was initially moderately variable, but variation steadily reduced to become weak. Geomagnetic activity was Unsettled to Active (Kp 3-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Moderate activity is expected, with Moderate flares expected at times and a slight chance of isolated Strong flares, primarily from the regions on the northeast disc.

Solar Wind / Geomagnetic Activity: There is one CME in the forecast, which could give a glance on Day 1 (02 Feb). There is uncertainty in the possible geomagnetic response to this - it is most likely to be a glancing blow with little significant effect, but with potential for something stronger.

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Earth is currently connecting to fast solar winds, with speeds around 600km/s at present. Wind speeds expected to gradually ease during Days 2 and 3 (03-04 Feb), returning to generally slightly elevated levels by Day 4 (05 Feb).

Unsettled to Active geomagnetic activity is expected, with a chance of G1/Minor storms on Day 1 (02 Feb), and a slight chance of a G2/Moderate Storm interval. There is a very slight chance of G3/Strong storms should any CME be more geoeffective. Activity then expected to ease during Days 2-3 (03-04 Feb) to become generally Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain at background levels. However, there is a slightly increasing risk of a rise through this period, as the complex of sunspots in the northeast disc move towards the western hemisphere.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	50	20	5	5
Strong	G3	No	10	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	75	75	75	75
Very Active	R3-R5 (X Class)	No	15	15	15	15

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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